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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/701,067	11/05/2003	John Mark Torkelson	6313.190A	6310

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EXAMINER
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RONESI, VICKEY M

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/701,067	<b>Applicant(s)</b> TORKELSON ET AL.	
	<b>Examiner</b> Vickey Ronesi	<b>Art Unit</b> 1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 9-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                              |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                              | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/26/04</u> . | 6) <input type="checkbox"/> Other: ____.                                                |

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## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-8, 16, and 17, drawn to a method of producing a nanocomposite, classified in class 264, subclass 176.1.
  - II. Claims 9-15, drawn to a polymer-clay nanocomposite, classified in class 524, subclass 445.

2. The inventions are distinct, each from the other because:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the polymer-clay nanocomposite can be prepared by processes including in situ polymerization and exfoliating of the clay before adding to polymer.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Joseph Berenato on 10/14/2005 a provisional election was made *with* traverse to prosecute the invention of Group I, claims 1-8, 16, and 17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-15 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### *Drawings*

6. Figures 6 and 7 are objected to since they are unclear. The Notice of Draftsperson's Patent Drawing Review (Form PTO-948) is attached.

### *Specification*

7. The disclosure is objected to because throughout the specification, the percentage amounts of ingredients are intermittently described in wt % (e.g., page 7, line 8 and page 10, lines 11-12). A designation of wt % with each recited amount should be recited in the specification. Alternatively, a statement indicating that all amounts are based on weight could be added to the specification.

Appropriate correction is required.

### *Claim Objections*

8. Claims 1-5, 8, and 16 are objected to because of the following informalities:

With respect to claim 1, the phrase "exfoliating the mixture" causes confusion since the clay, and not the mixture, is exfoliated. In particular, note page 2, lines 23-24 of the present

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specification where the clay itself is taught to be exfoliated and not the mixture. Also, the phrases “the extruded mixture” and “the resulting exfoliated mixture” lack antecedent basis.

With respect to claim 2, the phrase “said step of exfoliating” lacks antecedent basis.

With respect to claims 3 and 4, the amount of organoclay lacks basis, i.e., is it % by weight or % by volume?

With respect to claim 5, the amounts of clay and organic content lack basis, i.e., is it % by weight or % by volume?

With respect to claim 8, the word “at” in line 2 should be replaced with “to” so that it read as “to about 10° Celsius”.

With respect to claim 16, the phrase “the resulting mixture” in the last line of the claim lacks antecedent basis.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-8, 16, and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by

“PMSE Preprint” (Lebovitz et al, “Innovative Process for Compatibilizing Polymer Blends and

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Producing Well-Exfoliated Polymer Nanocomposites: Solid-State Shear Pulverization”, PMSE Preprints, 88, pp. 96-97).

“PMSE Preprint” discloses a method of producing well-exfoliated nanocomposites by solid-state shear pulverization of 95/5 wt % polypropylene/montmorillonite organoclay blends (Figure 3). Note that the Figure 3 is identical to Figure 5 in the present specification. Therefore, it is considered inherent that the composition in the reference reads on the presently composition limitations.

In light of the above, it is clear that “PMSE Preprint” anticipates the presently claimed invention.

10. Claims 1, 7, and 16 are rejected under 35 U.S.C. 102(a) as being anticipated by “ACS National Meeting Abstract” (Lebovitz et al, “Innovative Process for Compatibilizing Polymer Blends and Producing Well-Exfoliated Polymer Nanocomposites: Solid State Shear Pulverization”, Abstracts of Papers, 225<sup>th</sup> ACS National Meeting, New Orleans, LA, March 23-27, 2003, American Chemical Society: Washington, DC, PMSE-057).

The “ACS National Meeting Abstract” discloses a process of exfoliating polypropylene-clay nanocomposites via solid-state shear pulverization.

In light of the above, it is clear that “ACS National Meeting Abstract” anticipates the presently cited claims.

11. Claims 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Zwart (EP 1 029 644, cited on IDS filed 8/26/2004).

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Zwart discloses a method comprising grinding a polymeric resin (paragraph 0018) with additives such as reinforcing materials and clay (paragraph 0015) and inorganic and organic pigments (paragraph 0014) in the presence of a cooling airflow while maintaining the polymeric resin in the solid state (paragraph 0025). The pulverization includes shearing forces (paragraph 0021).

In light of the above, it is clear that Zwart anticipates the presently cited claims.

12. Claims 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Khait et al (WO 02/11963, cited on IDS filed 8/26/2004).

Khait et al discloses a method of making polymeric particulates comprising pulverizing a mixture of polymer and filler such as cellulose by solid-state shear pulverization in the presence of cooling and then discharging the resulting material (claims 45-48).

In light of the above, it is clear that Khait et al anticipates the presently cited claims.

13. Claims 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Feder et al (US 4,650,126).

Feder et al discloses process of grinding at ambient temperature of soft polymers (col. 2, lines 48-59) in the presence of a grinding aid (col. 3, lines 2-11), wherein the process includes mixing the two components before air is blown through for cooling while grinding and then they exit out (abstract, col. 3, lines 12-31).

In light of the above, it is clear that Feder et al anticipates the presently cited claims.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feder et al (US 4,650,126) alone or in view of Warner (US 4,025,643) and *Hawley's Condensed Chemical Dictionary* ("bentonite").

Feder et al discloses a processing for ambient temperature grinding of soft polymers (col. 2, lines 48-59) in the presence of a 5-20 wt % grinding aid such as clay (col. 3, line 4), wherein the process includes mixing the two components before air is blown through for cooling while grinding and then exits out (abstract, col. 3, lines 12-31).

While Feder et al does not disclose whether the clay is layered or not (i.e., exfoliatable or not), given that clay is either layered or not, it would have been obvious to one of ordinary skill in the art to utilize a layered clay that is exfoliatable. Evidence to support the examiner's position is found in Warner which teaches that grinding aids include bentonite and attapulgite clays (col. 3, lines 6-8). Note *Hawley's* which teaches that bentonite is composed chiefly of montmorillonite.

Therefore, a method comprising pulverizing a polymer with a layered clay intrinsically results in the exfoliation of the clay, thereby arriving at the presently cited claims.



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15. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zwart (EP 1 029 644, cited on IDS filed 8/26/2004) in view of Pinnavaia et al (*Polymer-Clay Nanocomposites*).

Zwart discloses a method comprising grinding a polymeric resin (paragraph 0018) with a rheological additive such as clay (paragraph 0015) in the presence of a cooling airflow while maintaining the polymeric resin in the solid state (paragraph 0025). The pulverization includes shearing forces (paragraph 0021).

Zwart does not disclose whether the clay is layered or not (i.e., exfoliatable or not), however, given that clay is either layered or not, it would have been obvious to one of ordinary skill in the art to utilize a layered clay that is exfolitable which also contains an organic component.

Evidence to support the examiner's position is found in Pinnavaia et al which teaches in the preface that organoclays have been traditionally used as rheological modifiers (page 1, first paragraph of the preface).

Given that Zwart is open to the use of clay as rheological agent, it would have been obvious to one of ordinary skill in the art to utilize a layered, organoclay as the rheological agent in Zwart in appropriate amounts wherein exfoliation of the clay intrinsically results and thereby arrive at the presently cited claims.

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*Contact Information*

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vickey Ronesi whose telephone number is (571) 272-2701. The examiner can normally be reached on Monday - Friday, 8:30 a.m. - 5:00 p.m.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

11/10/2005

vr



  
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